

Appendix B

Meteorological Data

This section contains meteorological data derived from various regulatory and non-regulatory sites. The data provides a comparative analysis of winds speed, wind direction, wind gusts and concentration data. Please note that meteorological instruments measure at different heights, and at different time intervals. By taking, the actual time of measurement and assuring that all data represented is in Pacific Standard Time (PST) there is uniformity of the data. In addition, not all stations measure at the exact same time, i.e. measurements at 053 and 056 therefore, comparisons are measurements within a 60-minute period. While there may be some overlapping and slight differences the comparative analysis provides the reader with a better understanding of the regional effect of the Exceptional Event.

FIGURE B-1
METEOROLOGICAL SITES IN SOUTHEASTERN CALIFORNIA AND YUMA, ARIZONA

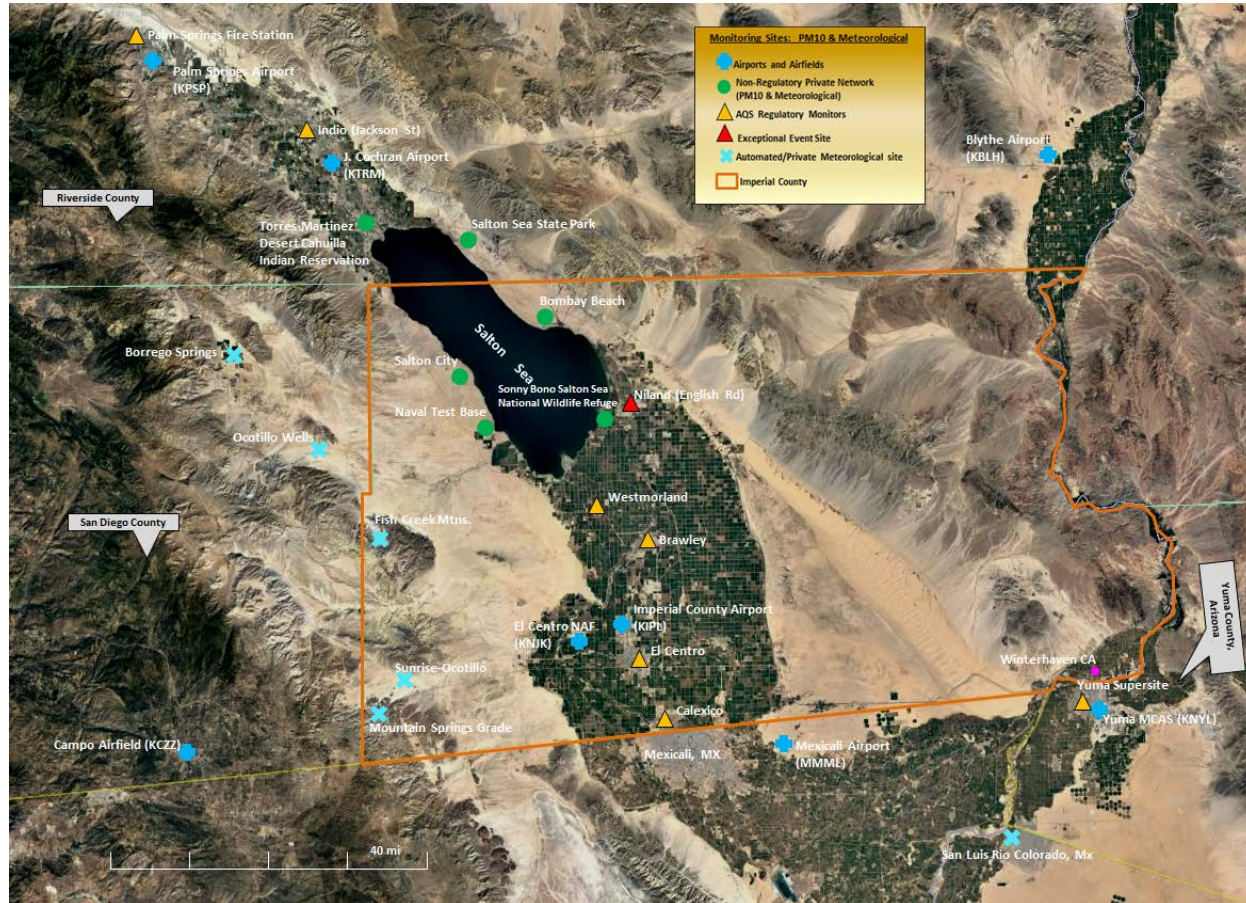
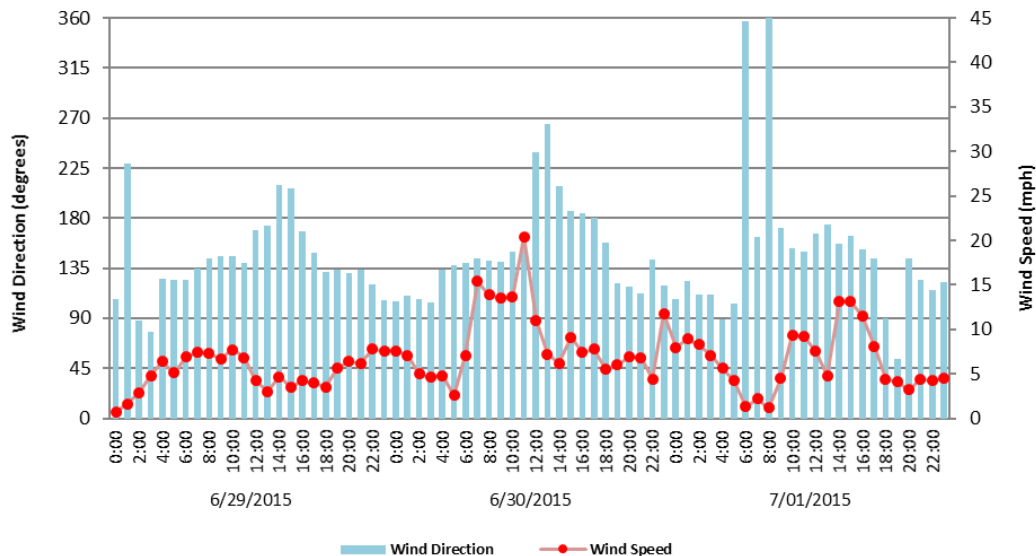


Fig B-1: This image shows the meteorological sites and the air quality monitoring sites used in this document. Google Earth base map. Inset locator map of California from Wikipedia

IMPERIAL COUNTY SITES FIGURES B-2 THROUGH B-12

**FIGURE B-2
NILAND WIND SPEED AND GUSTS AND DIRECTION**



**FIGURE B-3
NILAND WIND ROSE JUNE 30, 2015**

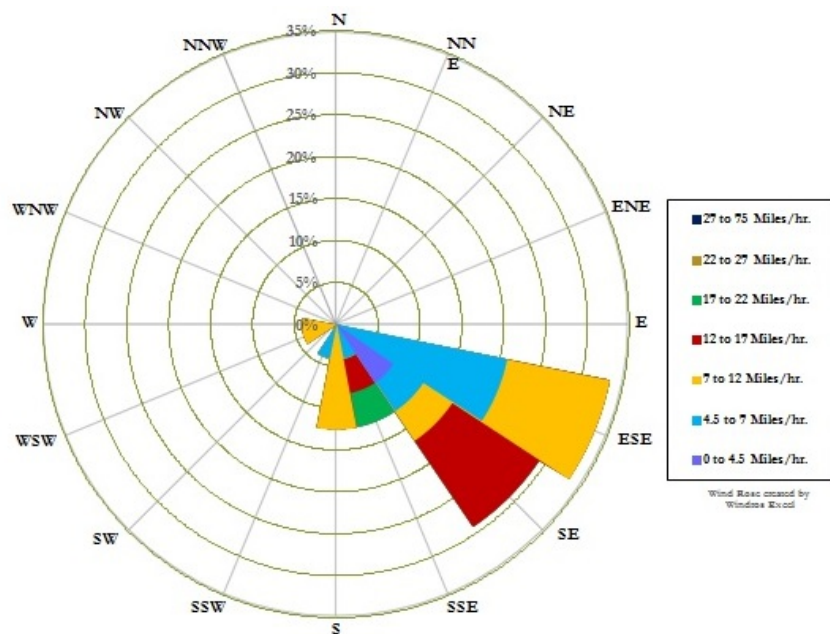


Fig B-2 & B-3: Niland showed a spike in winds, but not as great as upstream stations. This allowed for dust to be deposited on the monitor. The wind rose shows an ESE-Se trend. Air quality and wind data from the AQS data bank

FIGURE B-4
IMPERIAL COUNTY AIRPORT (KIPL)
WIND SPEED AND GUSTS AND DIRECTION

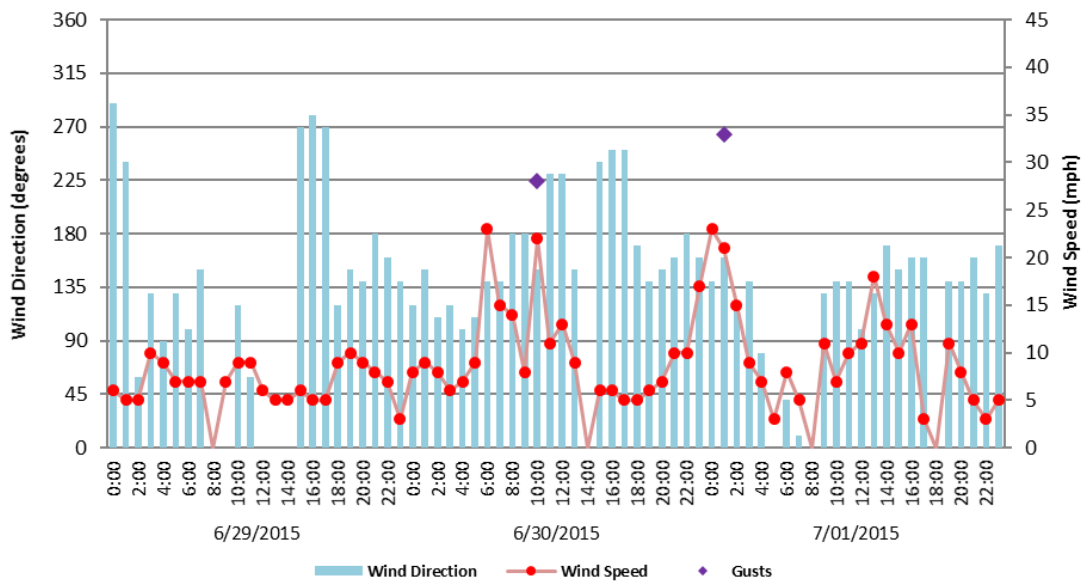


Fig B-4: Imperial County Airport was on the outside edge of the monsoonal flow, and didn't receive as strong of winds as sites to the east. NCEI QCLCD data

FIGURE B-5
EL CENTRO NAF (KNJK)
WIND SPEED AND GUSTS AND DIRECTION

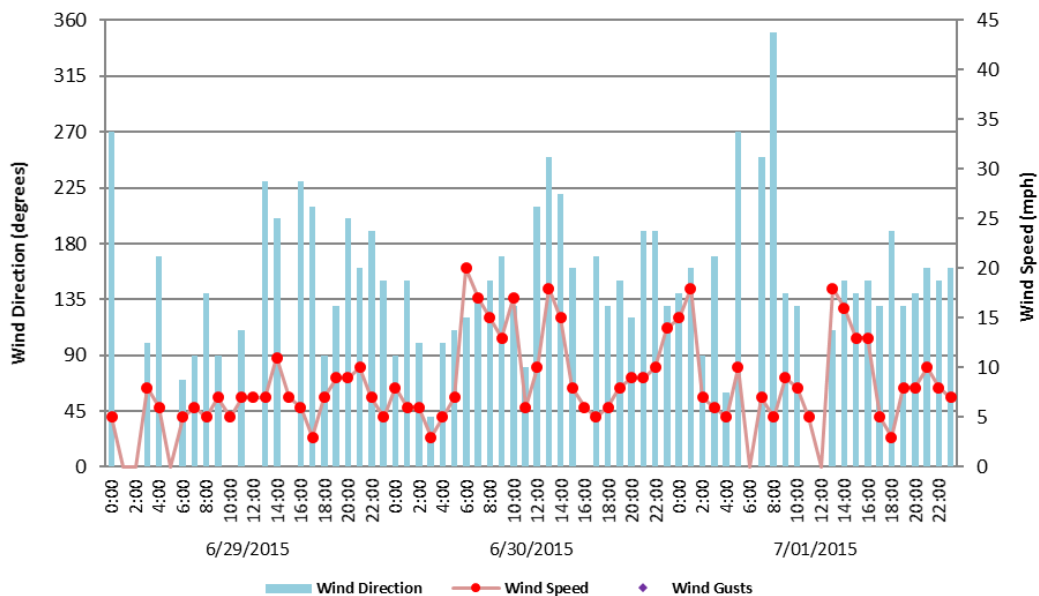


Fig B-5: El Centro NAF was on the outside edge of the monsoonal flow, and didn't receive as strong of winds as sites to the east. NCEI QCLCD data

FIGURE B-6
CAHUILLA RANGER STATION
WIND SPEED AND DIRECTION

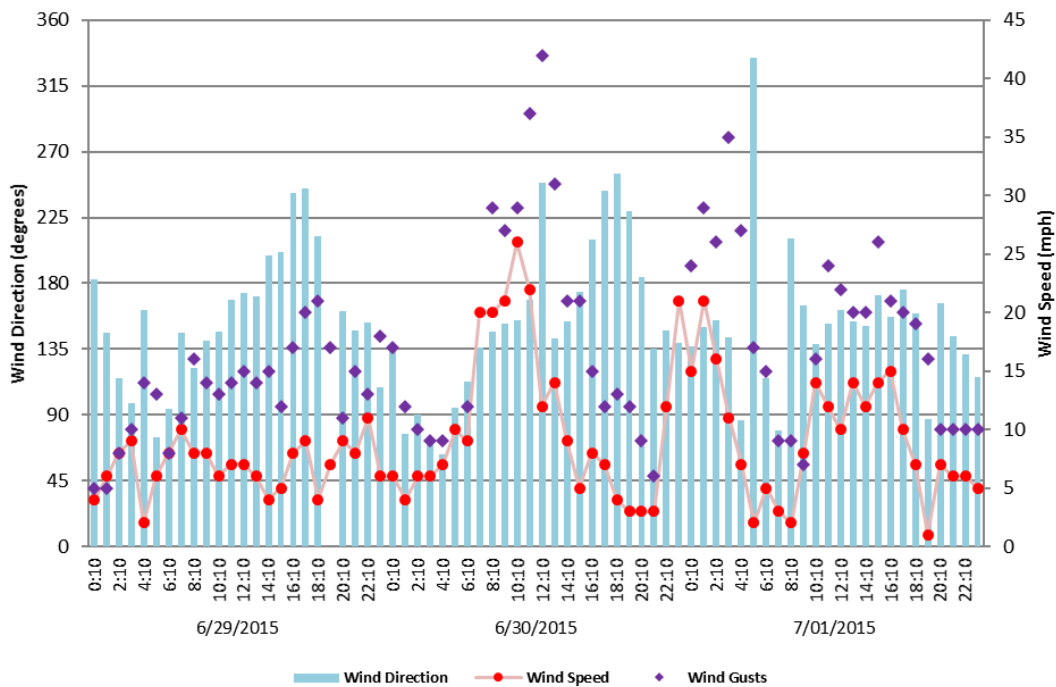


FIGURE B-7
CAHUILLA RANGER STATION WIND ROSE JUNE 30, 2015

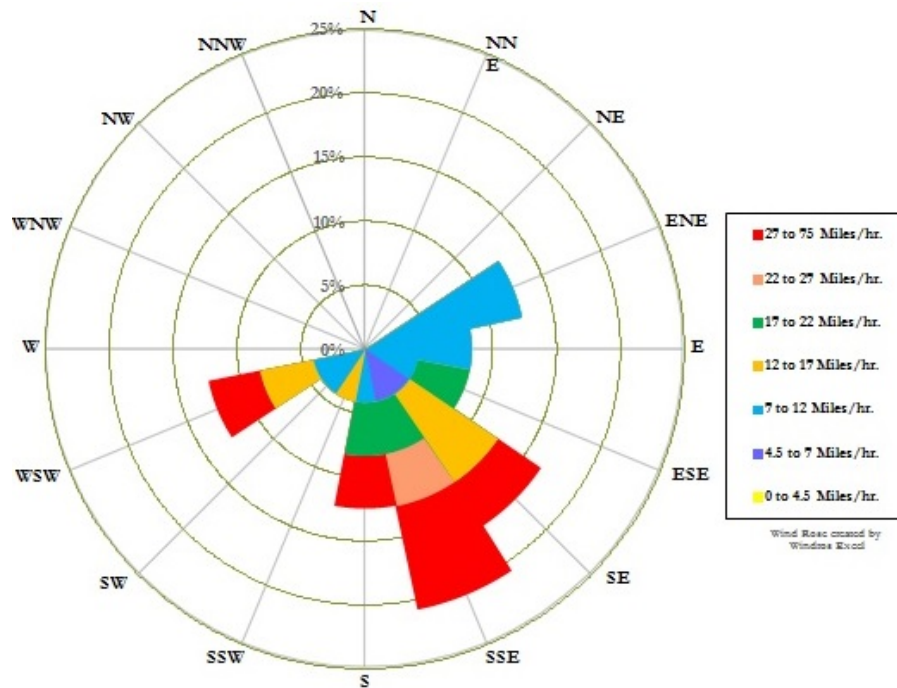


Fig B-6 & B-7: Cahuilla RS (MesoWest Station ID: QCAC1) was upstream from Niland

FIGURE B-8
GLAMIS WIND SPEED AND GUSTS AND DIRECTION

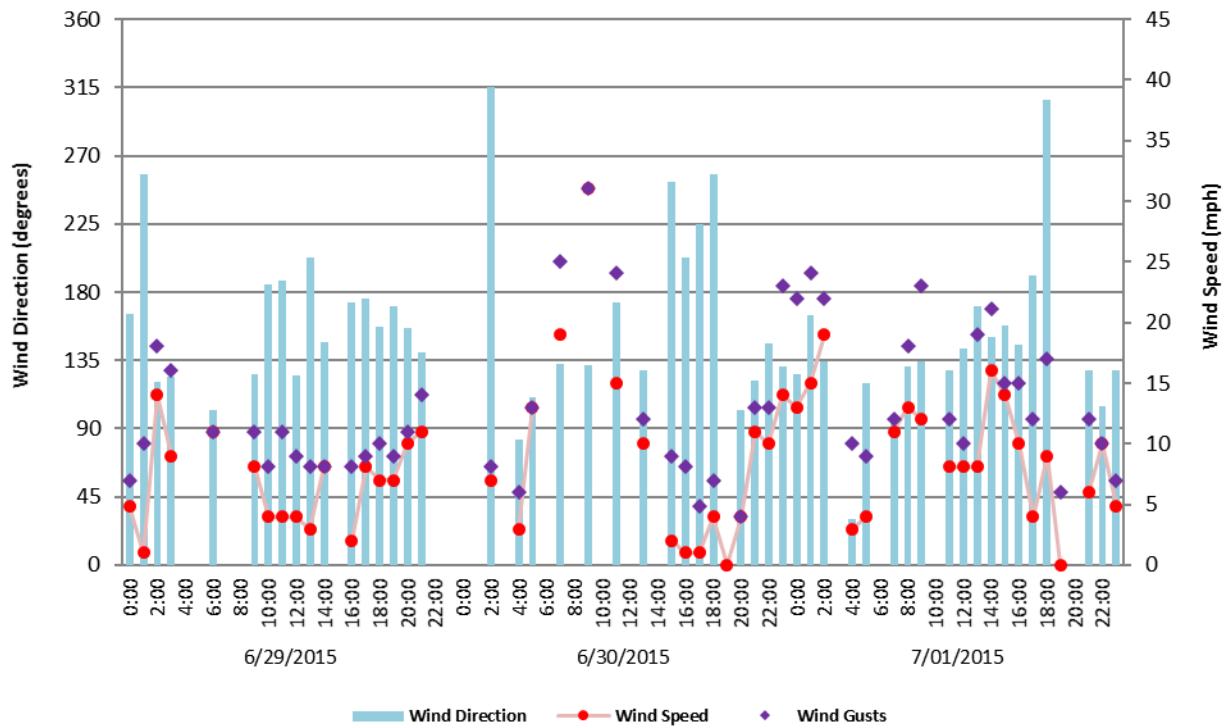


FIGURE B-9
GLAMIS WIND ROSE JUNE 30 2015

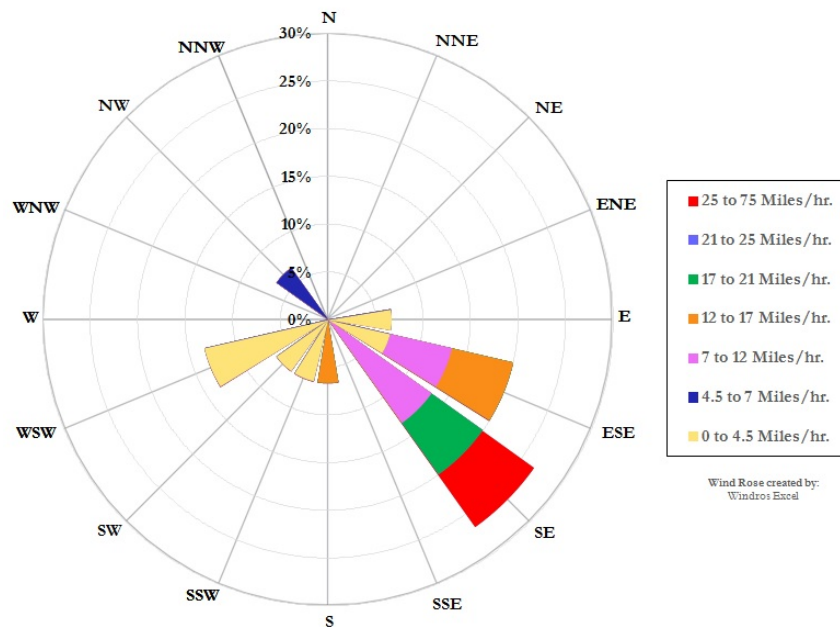


Fig B-8 & B-9: Glamis (MesoWest Station ID: UP615) was upstream from Niland

FIGURE B-10
BUTTERCUP RANGER STATION
WIND SPEED AND GUSTS AND DIRECTION

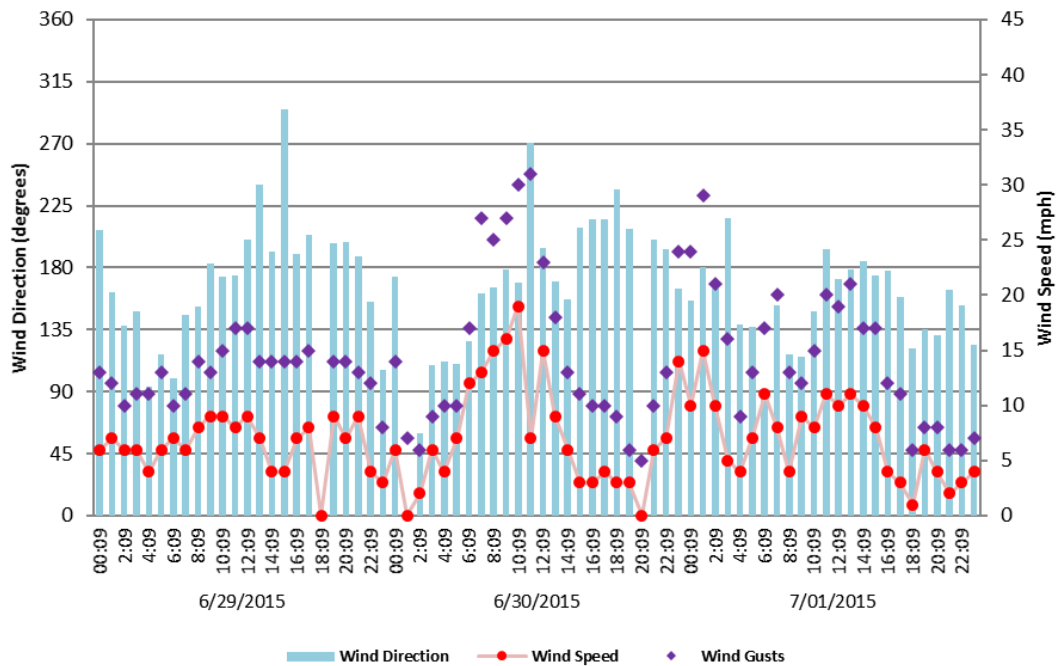


FIGURE B-11
BUTTERCUP RS WIND ROSE JUNE 30, 2015

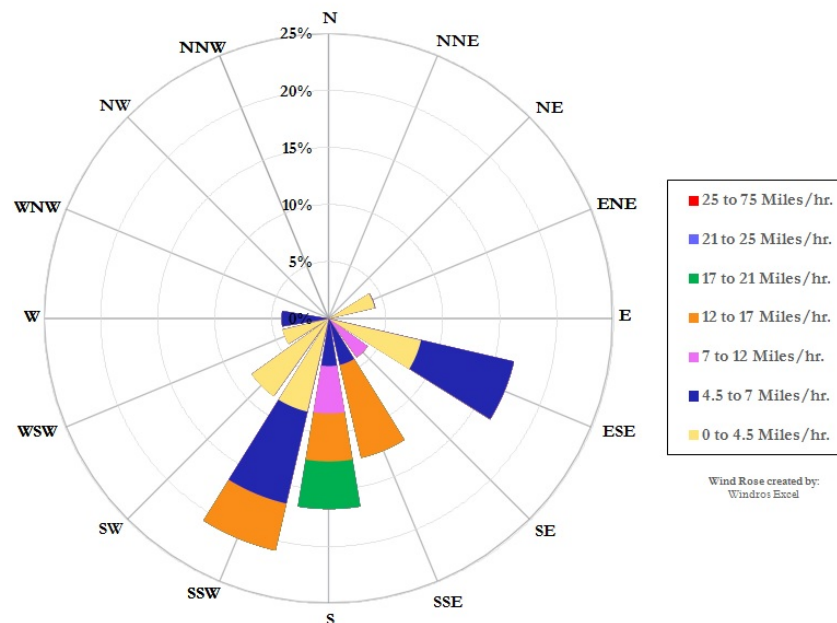


Fig B-10 & B-11: Buttercup RS (MesoWest Station ID: BTTC1) was upstream from Niland

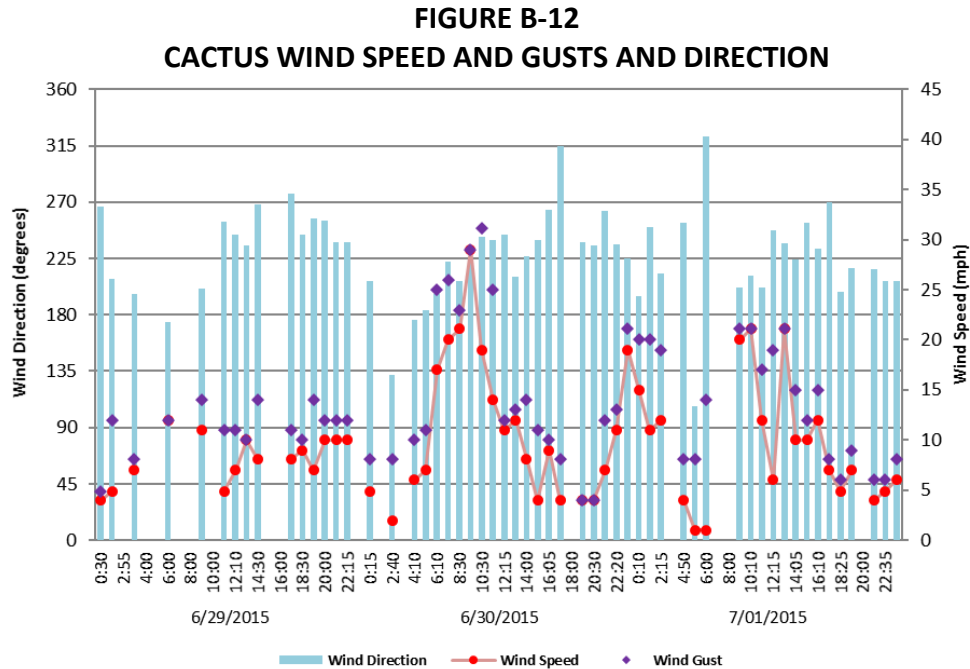


Fig B-12: Cactus (MesoWest Station ID: UP589) was upstream from Niland

UPSTREAM WIND SITES—MEXICO

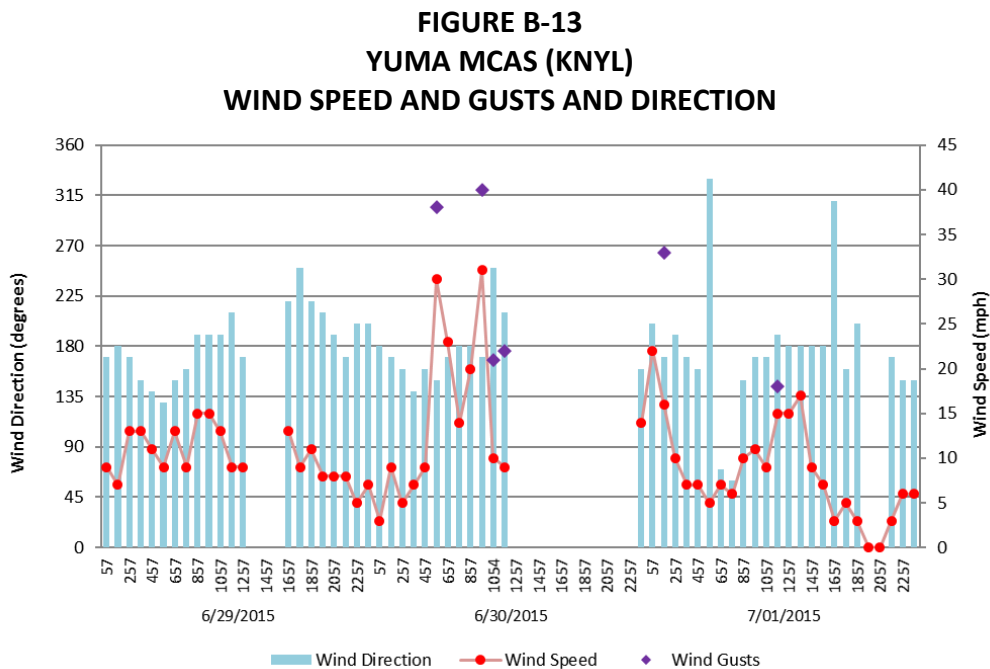


Fig B-13: Yuma MCAS is missing some data, but still shows winds were strongest when they were southerly. Blowing dust was reported at 0554 PST, 0557 PST; 0657 PST; 0957 PST

FIGURE B-14
MEXICALI INTERNATIONAL AIRPORT (MMML)
WIND SPEED AND GUSTS AND DIRECTION

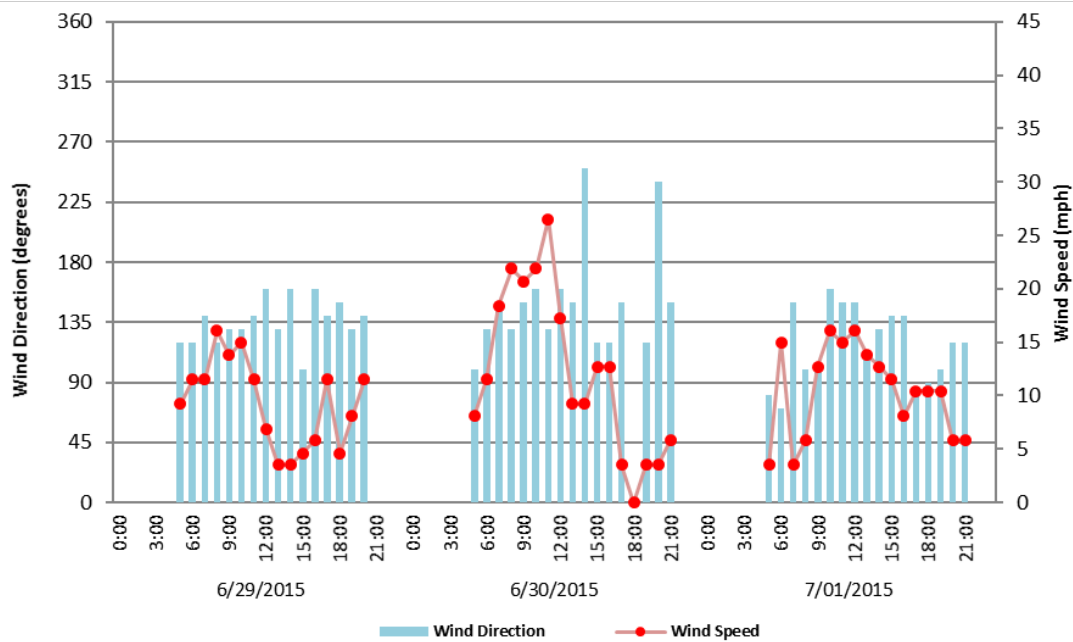


Fig B-14: Mexicali Airport is missing some data, but still shows a spike of southerly winds. Data from MesoWest

FIGURE B-15
SAN FELIPE WIND SPEED AND GUSTS AND DIRECTION

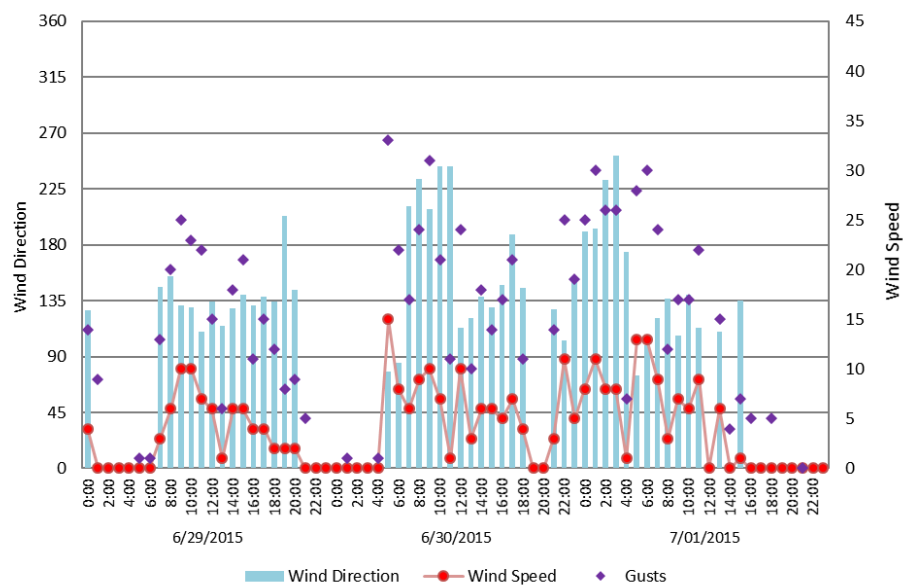


Fig B-15: San Felipe was on the western edge of the monsoonal flow and did not receive as high of winds as Puerto Peñasco to the east. MesoWest Station ID: EW0649

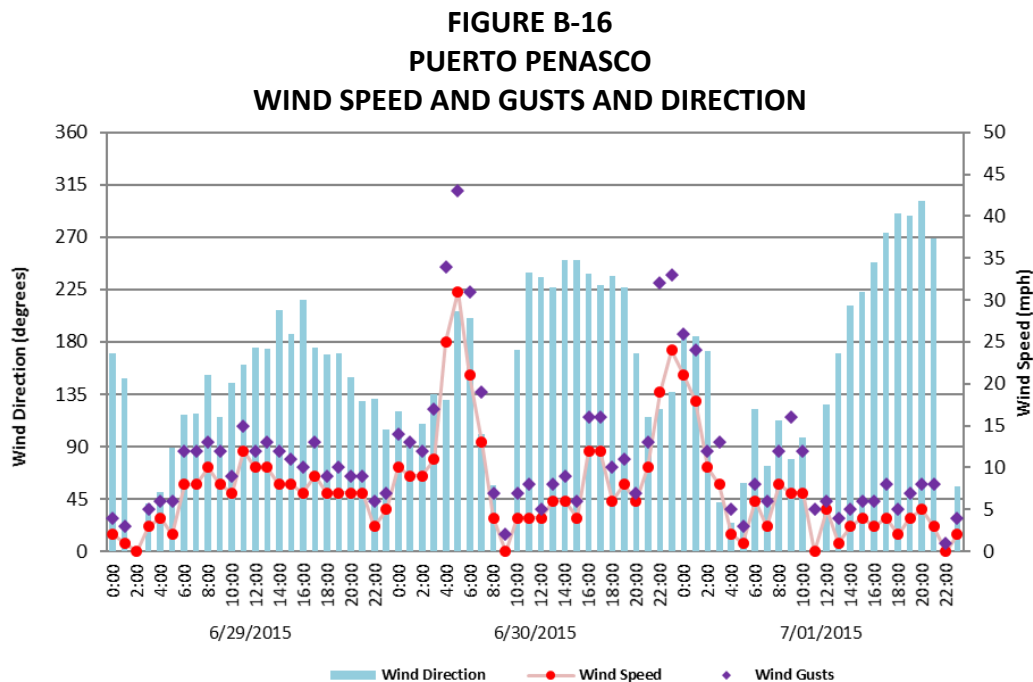


Fig B-16: Puerto Peñasco near the source area shows strong eastern-to-southerly winds in the key hours before Niland's concentrations spiked. Winds later switched to westerly following the passage of the monsoonal system. MesoWest ID: EW1610

EASTERN RIVERSIDE COUNTY SITES

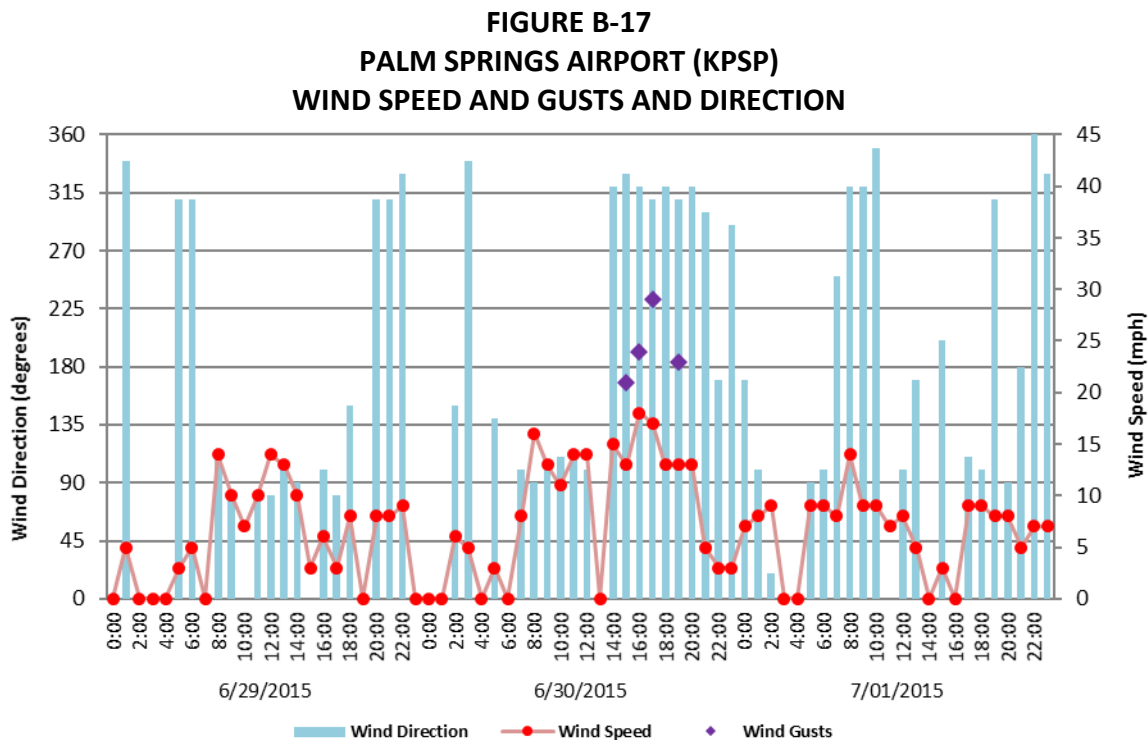


FIGURE B-18
JACQUELINE COCHRAN REGIONAL AIRPORT (KTRM)
WIND SPEED AND GUSTS AND DIRECTION

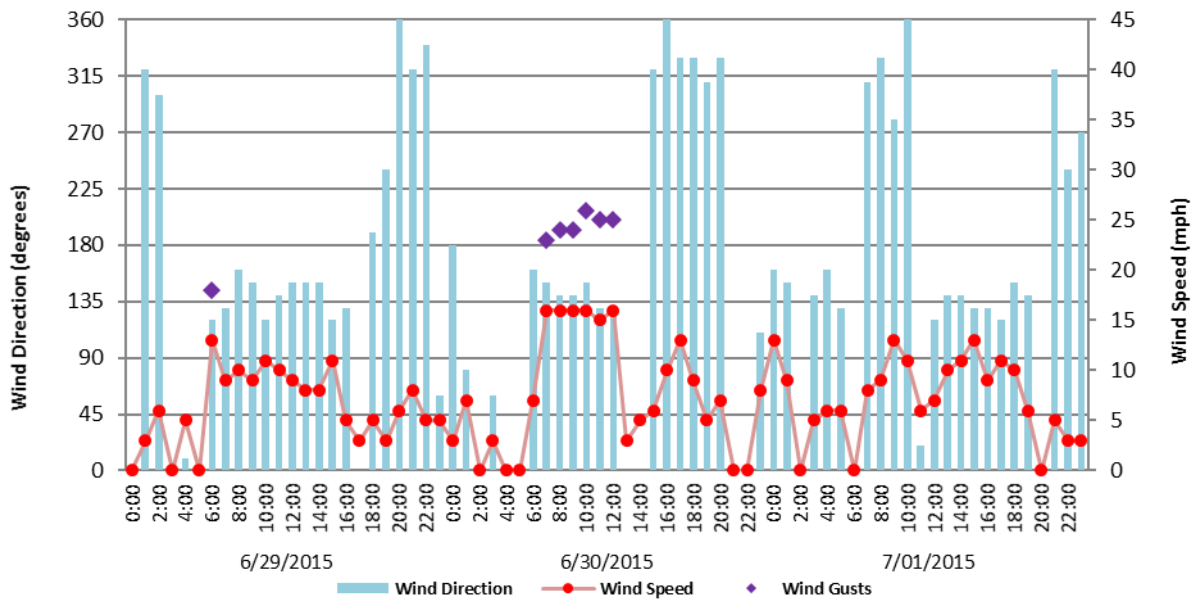
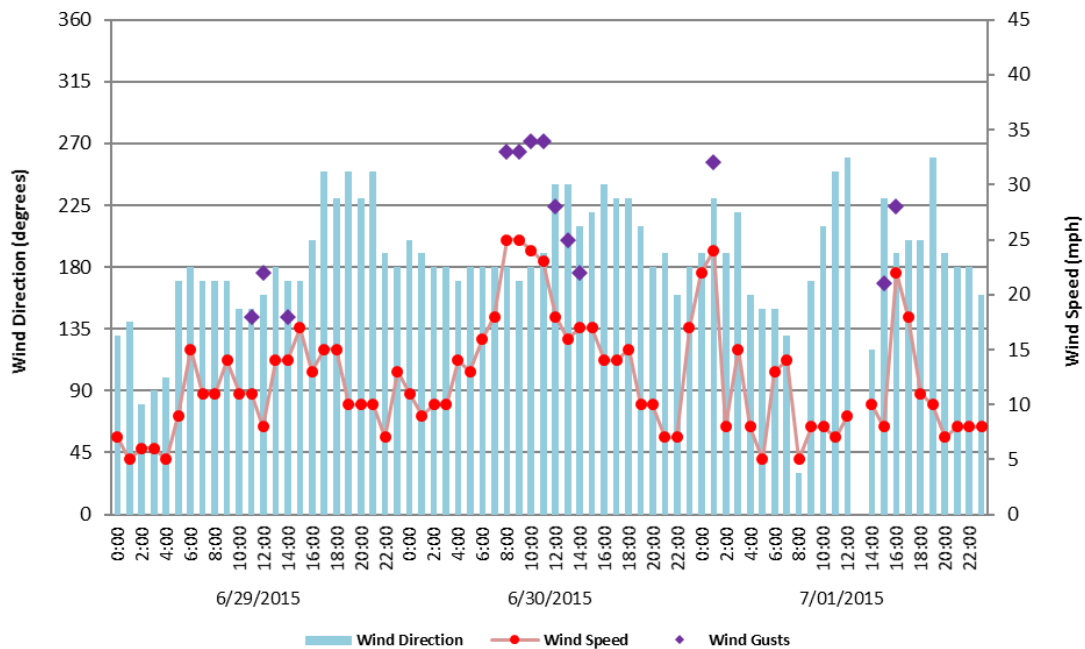


FIGURE B-19
BLYTHE AIRPORT (KBLH)
WIND SPEED AND GUSTS AND DIRECTION



Figs. B-17-B-19: Sites in eastern Riverside County saw elevated winds on June 30. Blythe, which was in the path of the monsoonal flow, saw the greatest increase. Data from the NCEI's QCLCD system

FIGURE B-20 **YUMA MCAS QCLCD**

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (may be updated) **HOURLY OBSERVATIONS TABLE** **YUMA MCAS (03145)** **YUMA, AZ** **(06/2015)**

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 213 ft. above sea level
Latitude: 32.65
Longitude: -114.616
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp (F)	Wet Bulb Temp (F)	Dew Point Temp (F)	Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
30	0057	5	CLR	10.00		90	32.2	74	23.2	66	18.9	45	7	200		29.55		29.77	AA		29.78	
30	0157	5	CLR	10.00		88	31.1	73	22.5	65	18.3	47	3	180		29.55		29.76	AA		29.78	
30	0257	5	CLR	10.00		87	30.6	73	22.7	66	18.9	50	9	170		29.54		29.76	AA		29.77	
30	0357	5	CLR	10.00		87	30.6	72	22.4	65	18.3	48	5	160		29.55		29.77	AA		29.78	
30	0457	5	CLR	10.00		87	30.6	72	22.1	64	17.8	46	7	140		29.56		29.78	AA		29.79	
30	0557	5	FEW100 FEW180 SCT250	10.00		86	30.0	71	21.6	63	17.2	46	9	160		29.57		29.79	AA		29.80	
30	0654	5	FEW100 FEW180 SCT250	1.00	BLDU	88	31.0	76	24.2	70	21.0	55	30	150	38	29.62		M	SP		29.85	
30	0657	5	FEW100 FEW180 SCT250	1.00	BLDU	88	31.1	76	24.2	70	21.1	55	30	150	38	29.62		29.84	AA		29.85	
30	0757	5	FEW100 FEW180 SCT250	4.00	BLDU	90	32.2	77	24.8	71	21.7	54	23	170		29.63		29.85	AA		29.86	
30	0857	5	FEW100 SCT180 SCT250	9.00		93	33.9	76	24.6	69	20.6	46	14	180		29.65		29.87	AA		29.88	
30	0957	5	FEW100 BKN200 BKN250	8.00	HZ	97	36.1	75	23.9	65	18.3	35	20	180		29.66		29.88	AA		29.89	
30	1024	5	SCT100 BKN200 BKN250	2.00	HZ	98	36.7	75	24.1	65	18.3	34	24	180	33	29.67		M	SP		29.90	
30	1032	5	SCT100 BKN200 BKN250	1.00	HZ	96	35.6	74	23.5	64	17.8	35	29	170	36	29.67		M	SP		29.90	
30	1039	5	FEW000 SCT100 BKN200	1.00		94	34.4	75	23.8	66	18.9	40	29	170	37	29.69		M	SP		29.92	
30	1047	5	FEW000 SCT100 BKN200	1.00		94	34.4	75	23.8	66	18.9	40	31	170	39	29.69		M	SP		29.92	
30	1057	5	FEW000 SCT070 OVC200	0.75	BLDU	94	34.4	75	23.8	66	18.9	40	28	180	40	29.68		29.90	AA		29.91	
30	1114	5	FEW000 BKN070 OVC100	0.50s	VCTSs	90	32.2	74	23.5	67	19.4	47	14	210	26	29.65		M	SP		29.88	
30	1124	5	BKN070CB OVC100	0.50s	TSRA	91	32.8	74	23.3	66	18.9	44	16	210		29.67		M	SP		29.90	
30	1144	5	FEW000 BKN070 OVC100	7.00	TSRA	85	29.4	75	23.7	70	21.1	61	14	290	25	29.58		M	SP		29.81	
30	1153	5	FEW030 BKN095 BKN120	0.50s		88	31.0	74	23.5	68	20.0	52	10	260		29.60		M	SP		29.83	
30	1154	5	FEW030 BKN095 BKN120	0.50s		87	30.6	74	23.3	68	20.0	53	10	250	21	29.60		29.82	AA	0.02	29.83	
30	1202	5	FEW065 BKN095 BKN150	10.00		86	30.0	76	24.2	71	21.7	61	9	210	22	29.62		M	SP		29.85	
30	1214	5	FEW065 SCT090 BKN150	10.00		88	31.1	75	23.8	69	20.6	53	8	180		29.63		M	SP		29.86	
30	1257	5	SCT100 BKN150 BKN200	10.00		92	33.3	77	25.1	71	21.7	50	15	200		29.63		29.85	AA		29.86	

Dynamically generated Mon Mar 28 12:29:43 EDT 2016 via <http://www.ncdc.noaa.gov/qclcd/QCLCD>

Fig B-20: Although Yuma MCAS is missing partial data, it did report gusty winds and blowing dust in the morning shortly before Niland experienced an increase in concentrations

FIGURE B-21 IMPERIAL COUNTY AIRPORT KIPL QCLCD

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final) HOURLY OBSERVATIONS TABLE IMPERIAL COUNTY AIRPORT (03144) IMPERIAL, CA (06/2015)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: -58 ft. below sea level
Latitude: 32.834
Longitude: -115.578
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. (in)	Altitude (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
30	0053	12	CLR	10.00		87	30.6	74	23.3	68	20.0	53	8	120		29.80			29.74	AA		29.74
30	0153	12	CLR	10.00		85	29.4	74	23.4	69	20.6	59	9	150		29.79			29.73	AA		29.73
30	0253	12	CLR	10.00		84	28.9	74	23.5	70	21.1	63	8	110		29.80			29.74	AA		29.74
30	0353	12	CLR	10.00		83	28.3	75	23.7	71	21.7	67	6	120		29.82			29.76	AA		29.76
30	0453	12	CLR	10.00		84	28.9	75	23.9	71	21.7	65	7	100		29.83			29.77	AA		29.77
30	0553	12	CLR	10.00		85	29.4	74	23.4	69	20.6	59	9	110		29.85			29.79	AA		29.79
30	0653	12	CLR	10.00		87	30.6	76	24.4	71	21.7	59	23	140		29.89			29.83	AA	T	29.83
30	0753	12	CLR	10.00		91	32.8	78	25.6	73	22.8	56	15	140		29.89			29.83	AA		29.83
30	0853	12	CLR	10.00		95	35.0	79	26.2	73	22.8	49	14	180		29.89			29.83	AA		29.83
30	0953	12	CLR	10.00		98	36.7	77	25.0	68	20.0	38	8	180		29.90			29.84	AA		29.84
30	1053	12	CLR	8.00		104	40.0	75	23.8	61	16.1	24	22	150	28	29.91			29.85	AA		29.85
30	1153	12	FEW070 SCT100 BKN120	10.00	-RA	98	36.7	72	22.4	59	15.0	27	11	230		29.84			29.78	AA	T	29.78
30	1253	12	CLR	10.00		98	36.7	72	22.4	59	15.0	27	13	230		29.83			29.77	AA	T	29.77
30	1353	12	CLR	10.00		98	36.7	74	23.2	62	16.7	31	9	150		29.82			29.76	AA		29.76
30	1453	12	CLR	10.00		101	38.3	73	22.9	59	15.0	25	0	000		29.80			29.74	AA		29.74
30	1553	12	CLR	10.00		103	39.4	74	23.2	59	15.0	23	6	240		29.77			29.71	AA		29.71
30	1653	12	CLR	10.00		102	38.9	73	22.8	58	14.4	23	6	250		29.75			29.70	AA		29.69
30	1753	12	CLR	10.00		101	38.3	73	22.9	59	15.0	25	5	250		29.74			29.69	AA		29.68
30	1853	12	CLR	10.00		101	38.3	72	22.4	57	13.9	23	5	170		29.75			29.69	AA		29.69
30	1953	12	CLR	10.00		98	36.7	73	22.7	60	15.6	28	6	140		29.76			29.70	AA		29.70
30	2053	12	CLR	10.00		96	35.6	71	21.8	58	14.4	28	7	150		29.77			29.71	AA		29.71
30	2153	12	CLR	10.00		94	34.4	71	21.5	58	14.4	30	10	160		29.78			29.72	AA		29.72
30	2253	12	CLR	10.00		93	33.9	72	22.2	61	15.1	34	10	180		29.79			29.73	AA		29.73
30	2353	12	CLR	10.00		89	31.7	74	23.3	67	19.4	48	17	160		29.82			29.76	AA		29.76

Dynamically generated Mon Mar 28 18:00:04 EDT 2016 via <http://www.ncdc.noaa.gov/qclcd/QCLCD>

FIGURE B-22 EL CENTRO NAF QCLCD

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (may be updated) HOURLY OBSERVATIONS TABLE NAF (23199) EL CENTRO, CA (06/2015)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: -42 ft. below sea level
Latitude: 32.816
Longitude: -115.683
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp (F)	Wet Bulb Temp (F)	Dew Point Temp (F)	Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Altitude (in. hg)			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
30	0056	5	CLR	10.00		85	29.4	73	22.7	67	19.4	55	8	090		29.80		29.80	AA			29.76
30	0156	5	CLR	10.00		84	28.9	73	22.9	68	20.0	59	6	150		29.79		29.80	AA			29.75
30	0256	5	CLR	10.00		82	27.8	73	22.9	69	20.6	65	6	100		29.80		29.80	AA			29.76
30	0356	5	CLR	10.00		81	27.2	72	22.4	68	20.0	65	3	040		29.82		29.82	AA			29.78
30	0456	5	SCT200 SCT250	10.00		81	27.2	74	23.0	70	21.1	69	5	100		29.83		29.83	AA			29.79
30	0556	5	CLR	10.00		84	28.9	76	24.2	72	22.2	67	7	110		29.85		29.85	AA			29.81
30	0656	5	CLR	10.00		89	31.7	77	25.0	72	22.2	57	20	120		29.89		29.89	AA			29.85
30	0756	5	CLR	10.00		91	32.8	78	25.6	73	22.8	56	17	140		29.89		29.89	AA		T	29.85
30	0856	5	FEW080 FEW200 SCT250	10.00	-RA	96	35.6	79	26.0	72	22.2	46	15	150		29.89		29.89	AA			29.85
30	0956	5	FEW080 SCT150 BKN250	10.00		100	37.8	78	25.3	68	20.0	35	13	170		29.90		29.90	AA			29.86
30	1038	5	CLR	10.00		102	38.9	76	24.7	65	18.3	30	20	120		29.91		M	SP			29.87
30	1056	5	FEW080 SCT120 BKN250	10.00		103	39.4	76	24.2	63	17.2	27	17	130		29.91		29.91	AA			29.87
30	1156	5	FEW015 SCT080 OVC110	9.00	-RA	96	35.6	73	22.7	61	16.1	31	6	080		29.89		29.89	AA		T	29.85
30	1256	5	FEW020 BKN120 BKN250	10.00		99	37.2	71	21.8	56	13.3	24	10	210		29.83		29.83	AA			29.79
30	1356	5	FEW040 FEW080 BKN120	10.00		100	37.8	72	22.2	57	13.9	24	18	250		29.82		29.82	AA			29.78
30	1456	5	FEW080 SCT150 SCT250	10.00		103	39.4	73	22.7	57	13.9	22	15	220		29.79		29.79	AA			29.75
30	1556	5	FEW080 FEW150 SCT250	10.00		103	39.4	73	22.7	57	13.9	22	8	160		29.77		29.77	AA			29.73
30	1656	5	FEW080 FEW150 SCT250	10.00		103	39.4	73	22.7	57	13.9	22	6	VR		29.75		29.75	AA			29.71
30	1756	5	FEW150 FEW250	10.00		103	39.4	72	22.4	56	13.3	21	5	170		29.74		29.74	AA			29.70
30	1856	5	FEW150 FEW250	10.00		99	37.2	73	22.6	59	15.0	27	6	130		29.75		29.75	AA			29.71
30	1956	5	FEW100 SCT150 SCT250	10.00		95	35.0	71	21.4	57	13.9	28	8	150		29.75		29.75	AA			29.71
30	2056	5	FEW080 FEW150 SCT250	10.00		92	33.3	72	22.0	61	16.1	36	9	120		29.77		29.77	AA			29.73
30	2156	5	FEW080 FEW150 SCT250	10.00		91	32.8	71	21.6	60	15.6	35	9	190		29.79		29.79	AA			29.75
30	2256	5	CLR	10.00		91	32.8	71	21.6	61	16.1	37	10	190		29.79		29.79	AA			29.75
30	2356	5	CLR	10.00		89	31.7	74	23.0	66	18.9	47	14	130		29.82		29.82	AA			29.78

Dynamically generated Mon Mar 28 17:56:17 EDT 2016 via <http://www.ncdc.noaa.gov/qclcd/QCLCD>

Fig B-20: Neither KIPL nor KNJK received much effect from the monsoonal winds